

IN THE CLAIMS

The pending claims are as follows:

1. (Original) A liquid material ejection device, comprising:
 - a gas chamber;
 - a film located within the gas chamber, the film capable of providing a gas that dissociates from the film when heated by a heating source;
 - a conduit for ejecting liquid material in communication with the gas chamber;
 - a recharging gas source coupled to the gas chamber; and
 - a gas flow restricting device adapted to selectively provide gas from the recharging gas source to the gas chamber by actuation of the gas flow restricting device.
2. (Original) The liquid material ejection device of claim 1, wherein the liquid material includes liquid solder.
3. (Original) The liquid material ejection device of claim 1, wherein the gas includes hydrogen gas.
4. (Original) The liquid material ejection device of claim 1, wherein the film includes titanium hydride (TiH_2).
5. (Original) The liquid material ejection device of claim 1, wherein the heating source includes a laser heating source.
6. (Original) The liquid material ejection device of claim 1, wherein the gas flow restricting device includes a valve.

7. (Original) The liquid material ejection device of claim 6, wherein the valve includes a gas blocking mass wherein a location of the gas blocking mass is moveable from a first position to a second position using a method, including:

melting at least a portion of the gas blocking mass in the first position;
moving the gas blocking mass; and
solidifying the portion of the gas blocking mass in the second position.

8. (Original) The liquid material ejection device of claim 1, wherein the gas flow restricting device includes a membrane wherein gas permeability of the membrane is selectively controlled.

9. (Original) The liquid material ejection device of claim 8, wherein the gas permeability of the membrane is selectively controlled by varying a temperature of the membrane.

10. (Original) The liquid material ejection device of claim 9, wherein the membrane includes palladium (Pd).

11. (Original) A liquid material ejection device, comprising:

a gas chamber;
a film located within the gas chamber, the film capable of providing a gas that dissociates from the film when heated by a heating source;
a conduit for ejecting liquid material in communication with the gas chamber;
a recharging gas source coupled to the gas chamber; and
a valve adapted to selectively provide gas from the recharging gas source to the gas chamber by selective positioning of a gas blocking mass.

12. (Original) The liquid material ejection device of claim 11, wherein the valve includes a gas blocking mass wherein a location of the gas blocking mass is moveable from a first position to a second position using a method, including:

melting at least a portion of the gas blocking mass in the first position;
moving the gas blocking mass; and
solidifying the portion of the gas blocking mass in the second position.

13. (Original) The liquid material ejection device of claim 12, wherein the gas blocking mass includes a solder mass.

14. (Original) The liquid material ejection device of claim 11, wherein the liquid material includes liquid solder.

15. (Original) The liquid material ejection device of claim 11, wherein the gas includes hydrogen gas.

16. (Original) The liquid material ejection device of claim 11, wherein the film includes titanium hydride (TiH₂).

17. (Original) A liquid material ejection device, comprising:
a gas chamber;
a film located within the gas chamber, the film capable of providing a gas that dissociates from the film when heated by a heating source;
a conduit for ejecting liquid material in communication with the gas chamber;
a recharging gas source coupled to the gas chamber; and
a membrane adapted to selectively provide gas from the recharging gas source to the gas chamber by selectively altering a permeability of the membrane.

18. (Original) The liquid material ejection device of claim 17, wherein the gas includes hydrogen gas.

19. (Original) The liquid material ejection device of claim 17, wherein the film includes titanium hydride (TiH₂).

20. (Original) The liquid material ejection device of claim 17, wherein the permeability of the membrane is selectively controlled by varying a temperature of the membrane.

21. (Original) The liquid material ejection device of claim 17, wherein the membrane includes palladium (Pd).

22. (Original) A liquid material ejection device, comprising:

a plurality of print heads, including:

a gas chamber;

a film located within the gas chamber, the film capable of providing a gas that dissociates from the film when heated by a heating source;

a conduit for ejecting liquid material in communication with the gas chamber;

at least one recharging gas source coupled to at least one of the gas chambers;

at least one gas flow restricting device adapted to selectively provide gas from the recharging gas source to at least one of the gas chambers by actuation of the gas flow restricting device; and

a print positioning system capable of locating at least one of the print heads relative to a substrate surface.

23. (Original) The liquid material ejection device of claim 22, wherein the print positioning system includes an X-Y translation stage.

24. (Original) The liquid material ejection device of claim 22, wherein a single recharging gas source is provided for multiple gas chambers.

25. (Original) The liquid material ejection device of claim 22, wherein a single gas flow restricting device is provided for multiple gas chambers.

26. (Original) The liquid material ejection device of claim 22, wherein a first one of the plurality of print heads contains solder, and a second one of the plurality of print heads contains flux.

27. (Original) A liquid material ejection device, comprising:
a gas chamber;
a means for storing gas located within the gas chamber, wherein the gas dissociates from the means when heated by a heating source;
a conduit for ejecting liquid material in communication with the gas chamber;
a recharging gas source coupled to the gas chamber; and
a selective gas access means for selective introduction of the gas from the recharging gas source to the gas chamber.

28. (Original) The liquid material ejection device of claim 27, wherein the means for storing gas includes a titanium hydride (TiH_2) film.

29. (Original) The liquid material ejection device of claim 27, wherein the selective gas access means includes a valve.

30. (Original) The liquid material ejection device of claim 27, wherein the selective gas access means includes a selectively permeable membrane.